LexFarm
Growing Community, Community Grown

To the Busa Land Use Proposal Committee
Subject: Answers to Questions as requested.
December 6, 2010

Dear Chairman Horton and Committee:

The board members of the Lexington Community Farm Coalition (LexFarm) have carefully considered the committee's questions from your November 18 meeting, and our answers are provided herein.

We'd like to preface our answers by underscoring the fact that our proposal provides a vision, or concept, for what a Lexington Community Farm could be, along with a budget that demonstrates how this concept could be financially viable based on the existing resources of the Busa Farm property. There are many community farms in Massachusetts and across the country that provide models for us. Every community farm is different, because the land, resources available and community context is different. There are also many different options that towns and cities have for working with and having input into their community farms. LexFarm is a nonprofit local-farming advocacy organization that is proposing to operate a community farm on the Busa Farm site in partnership with, and for the benefit of, the Town of Lexington and its residents. Hence, the path that the Lexington Community Farm takes will depend on the needs and interests of the people of Lexington as represented by Lexington's town government.

We have answered your questions consistent with our vision of a community farm. Many of our responses are clarifications or further details on information provided in our original concept proposal presented to the BLUPC committee on November 4th. Other questions are more difficult to answer, as yet, since there are multiple ways a successful community farm could choose to operate. These questions must ultimately be answered if and when the Town of Lexington determines that we will have a community farm on the Busa Farm site.

We appreciate the opportunity to provide the committee with this information and would be pleased to provide you with any additional information or clarifications you require as best we are able.

Sincerely,

Janet Kern, President
Lexington Community Farm Coalition, Inc.

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Questions and Answers

1. Will Lexington residents have first priority to purchase CSA shares?

While it is not a standard practice among CSA programs in the area to give first priority to Town residents, it is possible to do so. One way to accomplish this is to give residents an earlier CSA share application deadline than for the general public—any Town resident that submits an application prior to this deadline would have preference over non-residents. After this deadline, CSA shares would be granted on a first-come, first-served basis. There are likely to be other methods as well.

The decision of whether Lexington residents have first priority for CSA shares, and all implementation/policy details for farm operations - would be made by the board of directors who would seek broad community input as part of their decision-making process.

2. Please clarify the educational opportunities. (Do you have examples of educational opportunities provided by community farms in the area? How those farms have engaged the schools? Other actual examples?)

If the Town decides to use the land as a community farm, LexFarm would seek to develop its education programs with input from residents, the Town of Lexington, the Lexington Public Schools, and other public and private educational organizations in and around Lexington. Community farms in our area and across the country provide a valuable vision for what education at Lexington Community Farm would look like.

We have already spoken with farm educators from Drumlin Farm, Natick Community Organic Farm, Codman Farm, Waltham Fields Community Farm, Common Ground Farm, Land's Sake Farm, and Newton Community Farm. They are all willing and happy to share their experience and knowledge with us. We look to Natick Community Organic Farm in particular because they have a strong and successful business model behind their education programs. The Farm-Based Education Association (http://www.farmbasededucation.org/), based in Minuteman Park in Concord, would also provide valuable support for education programs at a Lexington Community Farm.

In addition to learning from existing Community Farms, LexFarm would seek to develop programs that are unique to Lexington's needs and history. In Year One (See Education Program Timeline Appendix A), we plan to conduct a survey asking citizens what kinds of educational programs they would participate in and what programs they would like to see happen (the online version would use a survey administration tool such as "Survey Monkey" sent out through the various Lexington listserves; paper copies would be placed at public places such as the Senior Center and Cary Library).

This survey would include questions about programs for the range of people of in our Town—seniors, adults, people with disabilities, young adults, and children. We would also continue discussions that we have already started with the K-5 Elementary Science and

Social Studies Coordinators in the Lexington Public Schools, Michael Horesh, Earth Science Teacher at Lexington High School, and Edward A Bouquillon, Superintendent at Minuteman High School and Minuteman High School staff. We met with these educators to find out how the farm could enhance their programs and curriculum. If plans for the farm proceed, we would expand these conversations to include other educators in Lexington and surrounding communities.

Lexington's K-5 Social Studies coordinator, Jane Hundley, suggested that the third-grade curriculum, which includes an in-depth study of colonial history, could incorporate a trip to Lexington Community Farm to learn about Lexington's farming history and to compare colonial farming practices to Native American practices of the same period and to modern farming practices. In fact, in preparation for Lexington's 300th Anniversary, Lexington's third-grade teachers expressed interested in focusing on the Town's farming history. A Community Farm would fit into this celebration.

As part of the Science curriculum, students could come to the farm during life science and earth sciences units. The farm is an ideal location to study soil, plants, ecosystems, and the water cycle (with the added benefit of the river and reservoir nearby). Alternatively, the farm educator could offer programs at the schools including assisting the schools in starting and maintaining their own gardens. Currently Bridge and Bowman Schools have started school gardens that include "Three Sister's Gardens."

Michael Horesh suggested that high school students in Lexington could conduct ongoing studies of soil, nutrients, and water quality on and around the farm. Teachers in Lexington K through 12 have been working to expand the engineering and design strand of the science curriculum The farm could be a place where students design and build parts of the infrastructure such as water filtration systems or composting systems and study how humans impact and manipulate our environment. Additionally, LHS students could earn community service hours for volunteer work on the farm.

In Year One, our plan is to work with LPS teachers to apply for a Lexington Education Foundation (LEF) grant to fund the LPS teachers' time to plan programs in conjunction with the farm staff and farm educator.

Beyond the school curriculum, LexFarm's proposal includes sponsoring internships in farming and in farm-based education for 3-8 high school students each year. We would seek to establish this program in Year One and expand it in subsequent years. We also plan to develop outside-of-school programs for preschool, elementary, middle, and high school students.

Beyond being an educational resource for the children of Lexington, our plan is for Lexington Community Farm to offer education programs for adults. We would use the data gathered in our initial survey as well as assess the skills of the staff and volunteers to determine which programs to offer first.

As you can see the range of educational opportunities and the resources that Lexington Community Farm can draw from are numerous. An appendix is attached that represents a possible 3-year plan for growing the education programs at LCF and examples of the types of school programs, out-of-school programs, and adult education programs that have been popular and successful at other farms.

We recommend the following websites for detailed examples of education programs at other community farms:

Natick Community Organic Farm:
http://www.natickfarm.org/Pages/Programs_Overview.html

Weston's Land's Sake Farm:
http://www.landssake.org/education

Another aspect of education programs that we would need to consider, if the Town decides to create a community farm is the cost of the programs. The education programs could be offered below cost and be supported through food production at the farm and donations. Alternatively, the programs could be offered at cost and be self-sustaining. Like other community farms in the area, the fee for a 1.5 hour program would have to be approximately $10-15 per person or per family (depending on the type of program) in order to cover the cost of materials, staff time, administration, and insurance. Other farms in the area have successful, self-sustaining education programs run through a combination of paid and volunteer staff.

While either a subsidized or an 'at-cost' model is feasible for Lexington Community Farm if 5 acres are under production, if less than 5 acres are under production it is *not* feasible for the CSA and other food sales to subsidize the education programs.
The full acreage of the Busa land provides the space needed for the depth and breadth of educational programs outlined above and the attached timeline. These programs require use of the educational community garden space as outlined in our proposal. If that space is not available, the first program to suffer would be the school field trip programs. Due to the cost of busing students to the farm, schools usually need to send all the students in a given grade level on a trip at the same time. It is not feasible to have 60 or more students exploring and learning in the production fields and at the same time meet the commitment to CSA shareholders to produce a high-quality share of produce each week. The scale and scope of educational programs would decrease as the acreage for the community farm decreases.

3. What codes might be required for educational purposes? Would bathrooms be required? What other codes?

Although we were not asked to answer this question, please note that we have provided in our business plan for temporary sanitary facilities initially, with a longer term goal of

building composting sanitary facilities similar to those recently constructed by Minuteman High School for Drumlin Farm.

4. Please clarify the estimated costs to repair and operate the greenhouse as we were told it was not in great shape.

The greenhouse in question was built in the 1950's. Our understanding is that it is suitable for its intended purpose: to grow seedlings and plants prior to, and during, the growing season. Please see Appendix B for a summary of the greenhouse condition and maintenance costs provided by Jane Hammer, who works closely with Dennis Busa helping to manage farm operations.

Please note that there were two wood-frame greenhouses on the property that were in disrepair and were taken down as part of the agreement for the Town of Lexington to purchase the property. The greenhouse in question is an aluminum-frame structure with glass panels and is in good condition. There is also a larger, temporary structure called a "hoophouse" on the site. This has double layers of thick plastic sheets covering an aluminum hoop structure, and serves as a secondary greenhouse.

In summary, we are not aware of any structural issues with the permanent greenhouse. Our current budget includes annual maintenance costs for the greenhouse and farm stand of $500, as well as utility costs of $5,000.

Our concept proposal does not include major capital expenditures related to the greenhouse, because we are not aware of any major condition issues. Appendix B suggests some options for enhancements to reduce utility costs and increase efficiency over time, but such options are more appropriately evaluated after the farm operation is established.

We'd like to stress that although our plan mentions use of "the greenhouse" in winter months for educational programs, that is not the primary expected use of the greenhouse in question. Our vision is for at least one temporary hoop-type greenhouse to be located in the "educational community garden" area, indicated in LexFarm's proposal. Greenhouses in this area are intended as educational facilities, including during winter months.

Related to this, Question #12 raises valid safety concerns that we had not considered, namely potential issues regarding the safe use of the permanent greenhouse for educational programs. LexFarm shares those concerns and recognizes that the Town would need to have the structure inspected by a qualified professional in anticipation of any such use by the public.

Although we certainly hope that there are no health risks to using the permanent greenhouse because it is such an important asset for a farm, our proposal for a community farm is not dependent on that particular structure and we are confident that we could adjust our plans to find an acceptable alternative to provide the needed space for starting seedlings and so on, should the permanent greenhouse be deemed unsafe for use.

Should the town decide that it wants to have a community farm operate on the site and work with LexFarm to manage it, we expect that all concerns about use of any structure will be evaluated thoroughly along with all other decisions regarding use of the land as part of our formal agreement with the town.

6. Condition of pump and well? Farmstand? Require investment?

This answer is similar to our answer regarding the condition of the greenhouse. As far as we know, the pump and well are in fine working condition; we understand from Dennis Busa that the well was drilled in 2002. The farm stand building is unheated, but provides adequate shelter and space for sales of produce, and includes a walk-in refrigerator and an area in the rear for washing and sorting – important and valuable space for a farm operation. LexFarm would likely evaluate how the structure might better serve the community farm operation over time and raise funds for necessary enhancements. Annual maintenance costs for the structure are included in our budget.

7. Financial benefits to Town? Will the Town require financial benefits?

Although we were not asked to answer this question, we thought it important to highlight that the proposal we submitted includes a budget summary that suggests a payment to the Town of $6,000 per year for use of the land. However, if the Selectmen decide to use the land for the operation of a community farm, we expect that the issue of lease/rent would be one of the items for discussion between the town officials and LexFarm as we work together to determine the arrangement that makes most sense for the Lexington. It may be that the town would decide to not collect a fee in lieu of reinvesting in more programming and community benefits from the farm. On the other hand, it could be decided that the rental/lease fee should be some value other than $6,000. What we know is that the community farm use would not be a drain on town resources and that it is financially sustainable for our model of a community farm to pay the Town an annual fee.

8. Farm manager, then education coordinator and farm supervisor - can the farming operation afford these expenditures? Maybe this question is not the purview of the Town/committee, but it may speak to the cost of running the farm and the cost of shares and the viability of the proposal.

Yes, LexFarm's budget as included in our proposal supports each of these positions. The salary of each will be paid for out of the proceeds from the farm operations. Only the farm manager would be hired for the first year per our proposal. The education coordinator would be added in the second year, and the farm supervisor would be added in year 4, according to the proposal presented by LexFarm.

10. Is the Lexington Community Farm Coalition looking at other parcels?

LexFarm was created in response to the Town's purchase of the Busa Farm property. Since that time, LexFarm has focused its efforts specifically on this particular piece of property for use as the base for a community farm.

Most small farm operations in the area, including Waltham Fields Community Farm and Newton Community Farm – are always looking for more land to cultivate. There is no doubt that with such small acreage as on the Busa property, that over time the farm operation would seek additional acreage to cultivate in order to provide more produce to more people and more income to support more programs . However, the base for a farm requires infrastructure that is not currently available elsewhere in Lexington; The quality of the soil, the existing greenhouses, well, parking and farm stand make the Busa Farm property an ideal base for a community farm.

Because we have heard genuine interest in understanding the potential of using the Waltham St. Fields conservation land for continued farming use, we have done a preliminary evaluation of the parcels in question. The complete soil survey is a large document, but is available on our website: **www.lexfarm.org/busa-farm-reference/** (scroll to the bottom of the page).

Summary: We have determined that roughly 8.2 acres is classified as "Freetown Muck" and has very limited use for farming. It is typically too wet to be planted until June and is best used for a single crop that prefers wet conditions, such as cranberries. Dennis Busa does manage to grow corn on that piece of property, which is a testament to his farming experience and the fact that he has a base operation with the needed infrastructure and a diversity of other crops on other land to support his farming operation.

We have determined that about 3.7 acres of the Waltham St. Fields is prime farmland, "Sudbury fine sandy loam" and could be very productive (and is) for an existing farm operation to use for additional production acreage., but given the limitations on building on conservation land, it would not be feasible as a base operation for a community farm due to lack of a greenhouse, sufficient parking or any outbuildings, including sanitary facilities.

11. How many CSA customers can be supported on 6 acres? -

The budget, as presented to the committee, includes 242 full-priced CSA shares, 13 low-income CSA shares, and $15,000 in food donations annually by year 5. One CSA share is generally understood to provide produce for a family of four .

CSA shares are only one way that a community farm would benefit the community. In addition, we estimate that after the farm is established, hundreds of people would be served each year by the farm through education programs, as mentioned in question #2, and the many volunteers that work on the farm. As an example, Waltham Fields Community Farm had 1,100 individuals volunteering more than 3,100 hours last year.

Appendix A
3 Year Educational Timeline
Lexington Community Farm Proposal

Year 1

	Example programs	**Estimated Participation**
Pre-School Age Children	• Weekly story and craft time for preschoolers and their parents. (see examples below).	6-10 families participate per week
School-Aged Children	• Partner with Lexington teachers to develop curriculum and programs (see examples below). • Partner with Kids Cooking Green program to visit farm • Plan Boy and Girl Scout programs • Plan 4H programs • Develop program for Home Schooled Students	Programs in development
Young Adults	• Develop community service program for high schools students (summer) • Pilot high school community service program (fall) • Develop programs with Minuteman Tech	3-6 high school students
Adults	• Develop and administer on-line survey to about adult educational programs • Offer 2 adult workshops based on interest expressed in online survey • Recruit and train volunteer stewards	• 50 adult participants in workshops • 6-10 volunteer stewards
Multi-generational	• Plan adaptive, accessible garden and programs • Community work days • Self-guided walks (such as bird watching walk, edible wild plants, other ideas?) • Letter boxing and Geo-caching • Farm Email Newsletter (monthly) • Seasonal celebrations for solstice and equinox – educational gatherings and celebrations • Fundraisers	• 20-30 participants in community work days • 1000+ people receive newsletter per month • 250+ participants in each seasonal celebrations and fundraiser

Year 2

	Example programs	**Estimated Participation**
Pre-School Age	• Weekly story and craft time for preschoolers	10-15 families

Children	and their parents	participate per week
School-Aged Children	• Pilot program(s) developed with Lexington teachers • Develop after-school program for Thursday afternoon early-release day • Partner with Kids Cooking Green program • Offer Boy and Girl Scout programs • Offer 4H programs • Offer program for Home Schooled students	400
Young Adults	• Run high school community service program • Run programs developed with Minuteman Tech • High School internship program in farming and farm-based education • High School science projects (collecting and analyzing data)	20 community service volunteers 4-8 High School interns 30 Minuteman Tech students 2 High School Science projects (60 students participate)
Adults	• Offer 5 adult workshops based on interest expressed in online survey • Continue to recruit and train volunteer stewards	• 120 adult participants in workshops • 6-10 volunteer stewards
Multi-generational	• Community work days • Self-guided walks (such as bird watching walk, edible wild plants, other ideas?) • Letter boxing and Geo-caching • Farm Email Newsletter (monthly) • Seasonal celebrations for solstice and equinox – educational gatherings and celebrations • Fundraisers	• 20-30 participants in community work days • 1500+ people receive newsletter per month • 350+ participants in each seasonal celebrations and fundraiser

Year 3

	Example programs	**Estimated Participation**
Pre-School Age Children	• Weekly story and craft time for preschoolers and their parents	15-20 families participate per week
School-Aged Children	• Offer program(s) developed with Lexington teachers in Years 1 and 2	600

	• Offer field trips to other towns • Develop new programs with Lexington teachers • Offer after-school program for Thursday afternoon early-release day • Offer programs with Kids Cooking Green • Offer Boy and Girl Scout programs • Offer 4H programs • Offer program for Home Schooled students	
Young Adults	• Run high school community service program • Run programs developed with Minuteman Tech • High School internship program in farming and farm-based education • High School science projects (collecting and analyzing data)	20 community service volunteers 4-8 High School interns 30 Minuteman Tech students 2 High School Science projects (60 students participate)
Adults	• Offer 6 adult workshops based on interest expressed in online survey • Continue to recruit and train volunteer stewards	• 160 adult participants in workshops • 6-10 volunteer stewards
Multi-generational	• Community work days • Self-guided walks (such as bird watching walk, edible wild plants, other ideas?) • Letter boxing and Geo-caching • Farm Email Newsletter (monthly) • Seasonal celebrations for solstice and equinox – educational gatherings and celebrations • Fundraisers	• 20-30 participants in community work days • 2000+ people receive newsletter per month • 400+ participants in each seasonal celebrations and fundraiser

Examples of Pre-School Programs:
The 1.5 hour programs would run at least once a week. Fee of $10-12/per family per session would cover the cost (LCF could subsidize cost with farm production). Minimum of 4 families needed to run the program and cover costs.

1. Read story about farmer's tools, explore farmer's tools, make your own simple tool
2. Read potato story and plant potatoes, decorate your own potato
3. Read pumpkin book and plant pumpkin seeds, make your own paper pumpkin
4. Read book about ducks, explore ducks' habitat at the Reservoir,
5. Read bug book, take a bug walk, design and make your own paper bug
6. Make a solar pizza box, make s'mores, eat them

Examples of Field Trips for School-Age Children[1]:
2-3 hour programs with fees approximately $7 per child.
***Close to the Ground: Eating for Your Health* Grades K-5**
Curriculum Connections:
MASS DOE Nutritional Frameworks:
- Identify the key nutrients in food that support healthy body systems and recognize that the amount of food needed changes as the body grows
- Use the USDA Food Guide Pyramid and its three major concepts of balance, variety, and moderation to plan healthy meals and snacks
- Identify the connection between food served in the home and regional food production

Program Format:
- An indoor experience including reading a book and identifying a variety of foods needed for a healthy daily energy. Students will learn about the new food pyramid and identify foods on the Farm related to the pyramid categories.
- An outdoor experience in the gardens harvesting and tasting food on the farm. Students will discuss and participate in activities to learn the meaning of terms related to food choices that are common but perhaps misunderstood, such as processed food and whole food. Students will learn how foods grow with sun, air, water, & soil and become fuel for their bodies.

Soil & Plants: Characteristics of a Living System Grades 3-5
Curriculum Connections:
MASS DOE: 3-5 Science - Biology:
- Identify structures in plants (leaves, roots, flowers, stem, bark, wood) that are responsible for food production, support, water transportation, reproduction, growth, and protection
- Recognize plant behaviors response to light, gravity, seasonal changes etc.
- Describe how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within a food chain from producers to consumers to decomposers.

Program Format:
Focus on the characteristics of a plant. Beginning with a vegetable plant in our gardens, students cooperate to identify plant parts and system functions. The class covers the processes plants use to eat and drink, seasonal changes, and how their botanical systems function. Students also learn the basics of plant identification.

Examples of Out-of-School Learning Programs for Children
Farmer's Helpers Program (Age 7-13)
Approximately $10/per student for 1.5 hour session.
Help start vegetable seedlings, transplant and prepare garden beds, harvest vegetables, help maintain farm and farm equipment. Depending on the work to be done and time of year sessions would include learning about the ecology, healthy eating, farming practices, soil, water, insect control, plant propagation, cultivation, and plant growth,

[1] From Natick Community Organic Farm
http://www.natickfarm.org/Pages/School_Programs/Elementary_Main.html

Examples of Adult Learning Programs:
Fees for these programs are approximate $20 per hour of instruction time.

1. Adaptive Gardening (how to use adaptive gardening tools)
2. Harvest hops and make beer
3. Harvest corn and grind for corn bread
4. Harvest and preserve
5. Culinary and medicinal herb workshop
6. Compositing and soil fertility
7. Bird watching
8. Organic Gardening
9. Fruit trees for your backyard
10. Starting your own garden
11. Farm tour
12. Historical Farming
13. Preserving and Canning Food
14. Jam and Jelly Making
15. Backyard Chickens
16. Ecological Lawn Care
17. Sustainable Landscape Design
18. Edible Wild Plants walk

Community Work Days (April-November)
One day a month from 9am-1:00pm
The Farm Manager and/or Volunteer Farm Stewards will give an overview of the work to be done that day on the farm. Then the volunteers will split up into groups (by age and experience) to complete the work. The farmer and steward will work to ensure that there is appropriate work for people ages 3-seniors. Children need to be accompanied by an adult. Volunteers will picnic together at the end of the work period. In subsequent years, additional community work days will be offered as the volunteer base increases.

Appendix B
Greenhouse Condition

This summary is provided by Jane Hammer, who has been involved with farming in her family and with community farms in the area for about 20 years. She currently works at Busa Farm and assists Dennis Busa with managing farm operations. As of 12/6/10, Dennis Busa is away and unavailable to confirm all of the information provided, so there may be some small inaccuracies; if you have any questions, we would be happy to confirm as soon as possible with Dennis.

Summary of current condition and maintenance needs for the near future: The greenhouse is intact and serves its current function quite well--raising seedlings for the farm and farmstand sales in the early spring through June, as well as growing lettuces and cold-hardy greens through late fall. This would be the most likely use for a diversified community farm, as well. Maintenance is about $100-200/year, according to Dennis, which includes replacement of some glass panels, re-caulking where needed, door maintenance, assuming the farmer does his/her own maintenance as he does.

The greenhouse is a Lord and Burnham, dating back to the 1950s. Insurance replacement cost for is believed to be $100,000. This value was corroborated by consulting with Griffin Greenhouse Supply Co. in Tewksbury. Lord and Burnham went out of business in 1978, but one could purchase an equivalent size and style of greenhouse (but with the more energy-efficient polycarbonate instead of glass panels) for $75,000 (materials only) i.e., not including labor to construct, foundation, electrical or plumbing.

A hoophouse replacement could be purchased for $15,000 (materials only) to replace the glass house, but there are significant drawbacks to hoop houses compared to the glass house (less durability/more maintenance, active venting through fans, shorter season of use, etc.) and you'd have to add in the labor required to erect it.

Structure: Approx. 100 ft. x 30 ft, aluminum framed with mostly glass panels. Panels are about 18" x 12" (my estimate) each and are easily replaced individually as needed. Dennis does all the maintenance himself and estimates about $100-200 per year. Seals with silicone caulk. There is an interior wall which allows 60 feet of the greenhouse to be closed off, reducing the greenhouse size to 40 feet during the deep winter and thus cutting heating costs down. Aluminum framing very durable and shows no sign of deterioration. Glass paneling is almost entirely intact, with the exception of one or two panels with small breakage and also several panels on the northwest wall which have been apparently replaced by wood panels. Moss is growing in some of the seams on the northwest side, which would not compromise the aluminum or glass, but could compromise the seal. Simple removal and re-caulking would solve this. Wooden doors on either end could use some repair for draft reduction (not too bad, really) and maintained with new paint and some hinge stabilizing on the west end door. No observable issues with the foundation, which I believe is concrete.

"Benches" (tables for setting plants): about ½ of the benches are wood pallets mounted

about 20 inches off the ground (essentially no-cost) ; other benches are coated steel wire mesh a little bit higher off the ground. There are aisles between the benches for walking which accommodate wagon transport. Lining the walls are shelves made of steel piping.

Venting: Passive (i.e. requiring no electricity) venting system at the roof peak that is manually operated at ground level and currently fully functional.

Heating: Mostly passive solar. When temperature dips to below freezing, usu. at night, it is heated by thermostat-controlled oil-burning furnace within the greenhouse which currently distributes heat via blowers on the furnace itself. The furnace is worth about $600-700 and belongs to Dennis. It is fully functional. Dennis does the maintenance himself (oil burner routine maintenance and any small repairs). Furnace is vented through a short pipe through the roof where there is sufficient cross draft (i.e. no need to extend the stove pipe any higher). There is also a partial system of radiator fins (exposed) running along the long walls which is not hooked up and is fairly rusty.

Watering: All handwatering. Water pumped up from the well is filtered, stored in a tank, then goes through a simple pump and fertilizer-mixing apparatus, then into the hose for handwatering. All is completely functional and in fine condition. I assume everything but the well and well pump belongs to Dennis.

Electricity: There are functional outlets along the length of the greenhouse and some lighting. Grounding may be needed? Outlets are well above bench level and slightly above wall shelves, I believe. Electricity is needed for the well pump and the small fertilizer system pump. No fans are needed because of the passive venting at the roof and through the doors.

Potential Updates (optional):

Glass panels replaced by polycarbonate would extend the season in which the greenhouse is useable (more insulative) and halve the heating needed. About $5000 for materials, plus possibly another $5000 for labor.

Benches could be replaced with benches specifically designed for greenhouses (see Griffin Greenhouse Supply in Tewskbury, link below)

Venting: could be automated and linked to thermostat. Cost? Decreases labor slightly.

Heating: furnace could be replaced by something more efficient and/or environmentally benign than 2 gallons oil/hour. Could be heated with help of solar hot water. Current usage is estimated by Dennis at 200 gallons each for Nov. and Dec., 400 gallons each for Feb. and March.

Watering: Could run piping throughout or other automated systems (see Griffin Greenhouse Supply in Tewsksbury, link below) which could be marked decrease in labor

needs, but would require more maintenance over time.

Electricity: May need updating to GFCI, depending on code. Could use renewable energy source (wind or photovoltaic) for pump electricity needs.

Link to largest greenhouse supplier for our area:
http://www.griffins.com/home/catalog.asp